CLAIMS:

1. A device for masking one or more selected areas of a field of view while capturing an image, comprising:

an image aperture formed in the device;

a spatial light modulator (SLM) comprising an array of movable reflective elements, the SLM being positioned at a first angle with respect to a central axis of image light rays entering the device through the image aperture, and the SLM being positioned such that the image light rays will hit at least some of the reflective elements on the SLM; and

an image capturing device for use in recording an image, the image capturing device being located in a position such that, when at least some of the SLM reflective elements are in a first position, at least some of the image light rays reflected from the SLM reflective elements positioned in the first position will hit at least part of the image capturing device.

2. The device of claim 1, wherein the SLM comprises a digital micro-mirror device.

3. The device of claim 1, wherein the SLM comprises an anti-reflective membrane device.

4. The device of claim 1, wherein the SLM comprises a deformable film modulator device

5. The device of claim 1, wherein the image capturing device comprises a digital light sensor.

6. The device of claim 1, wherein the image capturing device comprises a charge-coupled device.

7. The device of claim 1, wherein the image capturing device comprises photographic film.

8. The device of claim 1, wherein the image capturing device comprises a photo-reactive material that is formed on a semiconductor wafer.

9. The device of claim 1, further comprising:

a lens located in the image aperture.

10. The device of claim 1, further comprising:

a lens located within an image reflection path between the SLM and the image capturing device.

11. The device of claim 1, wherein the device is a camera.

12. The device of claim 1, wherein the device is part of a video camera.

13. The device of claim 1, wherein the device is adapted to be optically coupled to a telescope.

14. A device for masking one or more selected areas of a field of view while capturing an image, comprising:

an image aperture formed in the device;

a digital micro-mirror device (DMD) comprising an array of movable mirror elements, the DMD being positioned at a first angle with respect to a central axis of image light rays entering the device through the image aperture, and the DMD being positioned such that the image light rays will hit at least some of the mirror elements on the DMD; and

a charge-coupled device (CCD) comprising an array of photon sensing elements, the CCD being located in a position so that, when at least some of the DMD mirror elements are in a first position, at least some of the image light rays reflected from the DMD mirror elements positioned in the first position will eventually hit at least some of the CCD elements.

15. The device of claim 14, further comprising:

a shutter adapted to block the image light rays from striking the DMD when the shutter is closed and to allow at least some of the image light rays to strike the DMD when the shutter is open.

16. The device of claim 14, further comprising:

a controller electrically coupled to the DMD, the controller being adapted to selectively send signals to the DMD for causing one or more of the movable mirror elements to be actuated.

17. The device of claim 14, further comprising:

an electrical circuitry electrically coupled to the DMD and the CCD.

18. A system for reflecting a specified pattern of light rays onto a photo-reactive material layer, the photo-reactive material layer being formed on a semiconductor wafer, comprising:

a light source adapted to shine light rays into the system;

a digital micro-mirror device (DMD) comprising an array of movable mirror elements, the DMD being positioned at a first angle with respect to a central axis of the light rays entering the system from the light source, and the DMD being positioned such that the image light rays will hit at least some of the mirror elements on the DMD; and

the mirror elements of the DMD being controllably movable to a first position and to a second position, such that when one or more of the mirror elements are in the first positions, at least some of the light rays from light source are reflected from the DMD to the photo-reactive material, and when one or more of the mirror elements are in the second position, at least some of the light rays from the light source are reflected away from the photo-resistive material.

19. A device for masking one or more selected areas of a field of view while capturing an image, comprising:

an image aperture formed in the device;

a first digital micro-mirror device (DMD) comprising a first array of electrically controllable and movable mirror elements, the first DMD being positioned at a first angle with respect to a central axis of image light rays entering the device through the image aperture, and the first DMD being positioned such that the image light rays will hit at least some of the mirror elements on the first DMD;

a second DMD comprising a second array of electrically controllable and movable mirror elements, the second DMD being positioned at a first spaced distance from the first DMD, the second array of mirror elements facing in an opposite direction than the first array of mirror elements, and the second DMD being positioned so that, when at least some of the first DMD mirror elements are in a first position, at least some of the image light rays reflected from the first DMD mirror elements positioned in the first position will hit at least some of the second DMD mirror elements; and

a charge-coupled device (CCD) comprising an array of photon sensing elements, the CCD being located in a position so that, when at least some of the second DMD mirror elements are in a first position, at least some of the image light rays reflected from the second DMD mirror elements positioned in the first position will eventually hit at least some of the CCD elements.

20. The device of claim 19, wherein the second DMD position is offset relative to the first DMD position such that image light rays reflecting from the center of at least some of the first DMD mirrors at the first position hit a location on the second DMD where two or more second DMD mirror elements meet.

21. The device of claim 19, wherein the second DMD position is offset relative to the first DMD position such that image light rays reflecting from the center of at least some of the first DMD mirrors at the first position hit a location on the second DMD where two or more second DMD mirror elements meet.

22. The device of claim 19, wherein the second DMD is substantially parallel to the first DMD.

23. The device of claim 19, further comprising:

a third DMD comprising a third array of electrically controllable and movable mirror elements, the third DMD being positioned at a second spaced distance from the second DMD, the third DMD being substantially parallel to the second DMD, the third array of mirror elements facing in an opposite direction than the second array of mirror elements, and the third DMD being positioned so that, when at least some of the second DMD mirror elements are in a first position, at least some of the image light rays reflected from the second DMD mirror elements positioned in the first position will hit at least some of the third DMD mirror elements; and

the CCD also being located in a position so that, when at least some of the third DMD mirror elements are in a first position, at least some of the image light rays reflected from the third DMD mirror elements positioned in the first position will eventually hit at least some of the CCD elements.

24. The device of claim 23, further comprising:

a fourth DMD comprising a fourth array of electrically controllable and movable mirror elements, the fourth DMD being positioned at a third spaced distance from the third DMD, the fourth DMD being substantially parallel to the third DMD, the fourth array of mirror elements facing in an opposite direction than the third array of mirror elements, and the fourth DMD being positioned so that, when at least some of the third DMD mirror elements are in a first position, at least some of the image light rays reflected from the third DMD mirror elements positioned in the first position will hit at least some of the fourth DMD mirror elements; and

the CCD also being located in a position so that, when at least some of the fourth DMD mirror elements are in a first position, at least some of the image light rays reflected from the fourth DMD mirror elements positioned in the first position will hit at least some of the CCD elements.

25. A method of astrophotography, comprising the steps of:

during a first period of time, reflecting a first part of an image off of a first spatial light modulator (SLM) at a first angle so that at least some of the first part of the image will eventually strike an image capturing device;

also during the first period of time, reflecting a second part of the image off of the first SLM at a second angle that directs the second part of the image to a first location where the second part of the image will not go to the image capturing device; and

during a second period of time, reflecting at least a portion of the second part of the image off of the first SLM at the first angle so that at least some of the second part of the image will eventually strike the image capturing device.

26. The method of claim 25, wherein the SLM comprises a digital micro-mirror device.

27. The method of claim 25, wherein the image capturing device comprises a charge-coupled device.

28. A method of astrophotography, comprising the steps of:

during a first period of time, reflecting a first part of an image off of a first spatial light modulator (SLM) at a first angle toward a second SLM;

also during the first period of time, reflecting a second part of the image off of the first SLM at a second angle that directs the second part of the image to a first location where the second part of the image will not go to the second SLM;

also during the first period of time, reflecting a third part of the image off of the second SLM at a third angle so that at least some of the third part of the image will eventually strike the image capturing device, wherein the third part of the image comprises a portion of the first part of the image;

also during the first period of time, reflecting a fourth part of the image off of the second SLM at a fourth angle that directs the fourth part of the image to a second location where the fourth part of the image will not go to the image capturing device, wherein the fourth part of the image comprises another portion of the first part of the image;

also during the first period of time, striking at least part of the image capturing device with at least some of the third part of the image; and

during a second period of time, reflecting a fifth part of the image off of the first SLM at a fifth angle so that at least some of the fifth part of the image will eventually strike the image capturing device, wherein the fifth part of the image comprises at least some of the second part of the image, and wherein the fifth angle is about the same as the first angle.

29. The method of 28, further comprising the steps of:

also during the first period of time, reflecting a sixth part of the image off of a third SLM at a sixth angle so that at least some of the sixth part of the image will eventually strike the image capturing device, wherein the sixth part of the image comprises a portion of the third part of the image; and

also during the first period of time, reflecting a seventh part of the image off of the third SLM at a seventh angle that directs the seventh part of the image to a third location where the seventh part of the image will not go to the image capturing device, wherein the seventh part of the image comprises another portion of the third part of the image.

30. The method of 29, further comprising the steps of:

also during the first period of time, reflecting an eighth part of the image off of a fourth SLM at an eighth angle so that at least some of the eighth part of the image will eventually strike the image capturing device, wherein the eighth part of the image comprises a portion of the sixth part of the image; and

also during the first period of time, reflecting a ninth part of the image off of the fourth SLM at a ninth angle that directs the ninth part of the image to a fourth location where the ninth part of the image will not go to the image capturing device, wherein the ninth part of the image comprises another portion of the sixth part of the image.

31. A method of exposing different parts of a field of view for an image for various lengths of time, comprising the steps of:

during a first period of time, reflecting a first part of an image off of a first spatial light modulator (SLM) at a first angle so that at least some of the first part of the image will eventually strike an image capturing device;

also during the first period of time, reflecting a first remainder of the image off of the first SLM at a second angle that directs the first remainder of the image to a first location where the first remainder of the image will not go to the image capturing device, wherein the first remainder of the image is the image minus the first part of the image;

during a second period of time, reflecting a second part of the image off of the first SLM at the first angle so that at least some of the second part of the image will eventually strike the image capturing device;

also during the second period of time, reflecting a second remainder of the image off of the first SLM at the second angle that directs the second remainder of the image to the first location where the second remainder of the image will not go to the image capturing device, wherein the second remainder of the image is the image minus the second part of the image;

during a third period of time, reflecting a third part of the image off of the first SLM at the first angle so that at least some of the third part of the image will eventually strike the image capturing device; and

also during the third period of time, reflecting a third remainder, if any, of the image off of the first SLM at the second angle that directs the third remainder of the image to the first location where the third remainder of the image will not go to the image capturing device, wherein the third remainder of the image is the image minus the third part of the image.

32. The method of claim 31, wherein the first SLM comprises a digital micro-mirror device.

33. The method of claim 31, wherein the image capturing device comprises a charge-coupled device.

34. The method of claim 31, wherein the image capturing device comprises a photo-reactive material that is formed on a semiconductor wafer.

35. The method of claim 31, wherein the third part of the image is all of the image, and there is no third remainder.

36. The method of claim 31, further comprising the steps of:

also during the first period of time, reflecting a fourth part of the image off of a second SLM at a third angle so that at least some of the fourth part of the image will eventually strike the image capturing device, wherein the fourth part of the image comprises at least a portion of the first part of the image reflected from the first SLM;

also during the first period of time, reflecting a fourth remainder of the image off of the second SLM at a fourth angle that directs the fourth remainder of the image to a second location where the fourth remainder of the image will not go to the image capturing device, wherein the fourth remainder of the image is the image minus the first part of the image and minus the third part of the image; and

also during the second period of time, reflecting a fifth part of the image off of the second SLM at the third angle so that at least some of the fifth part of the image will eventually strike the image capturing device, wherein the fifth part of the image comprises at least a portion of the second part of the image reflected from the first SLM;

also during the second period of time, reflecting a fifth remainder of the image off of the second SLM at the fourth angle that directs the fifth remainder of the image to the second location where the fifth remainder of the image will not go to the image capturing device, wherein the fifth remainder of the image is the image minus the second part of the image and minus the fifth part of the image;

also during the third period of time, reflecting a sixth part of the image off of the first SLM at the third angle so that at least some of the sixth part of the image will eventually strike the image capturing device, wherein the sixth part of the image comprises at least a portion of the third part of the image reflected from the first SLM; and

also during the third period of time, reflecting a sixth remainder of the image off of the second SLM at the fourth angle that directs the sixth remainder of the image to the second location where the sixth remainder of the image will not go to the image capturing device, wherein the sixth remainder of the image is the image minus the third part of the image and minus the sixth part of the image.

37. A method of astrophotography, comprising the steps of:

during a first period of time, reflecting a first part of an image off of a first digital micro-mirror device (DMD) at a first angle to a second DMD;

also during the first period of time, reflecting a second part of the image off of the first DMD at a second angle that directs the second part of the image to a first light absorption location so that the second part of the image does not go to the second DMD;

also during the first period of time, reflecting a third part of the image off of the second DMD at a third angle so that at least some of the third part of the image will eventually strike a charge-coupled device (CCD), wherein the third part of the image comprises a portion of the first part of the image; and

also during the first period of time, reflecting a fourth part of the image off of the second DMD at a fourth angle that directs the fourth part of the image to a second light absorption location so that the fourth part of the image does not go to the CCD, wherein the fourth part of the image comprises another portion of the first part of the image.

38. The method of claim 37, further comprising the steps of:

during a second period of time, reflecting a fifth part of an image off of the first DMD at the first angle to the second DMD;

also during the second period of time, reflecting a sixth part of the image off of the first DMD at the second angle that directs the sixth part of the image to the first light absorption location so that the sixth part of the image does not go to the second DMD;

also during the second period of time, reflecting a seventh part of the image off of the second DMD at the third angle so that at least some of the seventh part of the image will eventually strike the CCD, wherein the seventh part of the image comprises a portion of the sixth part of the image; and

also during the second period of time, reflecting an eighth part of the image off of the second DMD at the fourth angle that directs the eighth part of the image to the second light absorption location so that the eighth part of the image does not go to the CCD, wherein the eighth part of the image comprises another portion of the sixth part of the image.